

## REMARKS

### 35 U.S.C. §103(a) Rejections

Claims 2, 5-10, 13, 14, 18, 20-22, 24, and 25 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Japanese Patent Pub. No. 02-075167 (the “Shimozu reference”) in view of multiple references. Specifically, claims 2, 5-10, 13, and 14 have been rejected over the Shimozu reference in view of U.S. Patent Pub. No. 2004/0072054 to Cochran *et al.* (the “Cochran reference”). Claims 18, 20-22, 24, and 25 have been rejected as being unpatentable over the Shimozu reference in view of U.S. Patent Pub. No. 2002/0177026 to Hatano *et al.* (the “Hatano reference”) and U.S. Patent Pub. No. 2004/0258972 to Du *et al.* (the “Du reference”).

The office action asserts that it would have been obvious to one skilled in the art at the time of the invention to modify the Shimozu reference in some fashion to arrive at the present claims. However, in light of the Supreme Court decision in *KSR v. Teleflex*, any obviousness determination must be consistent with the traditional *Graham* factors. Thus, obviousness is determined according to (1) the scope and content of the prior art, (2) the level of ordinary skill in the art, (3) the differences between the prior art and the claimed invention, and (4) the extent of any objective indicia of nonobviousness.

Furthermore, the key to supporting any rejection under 35 U.S.C. § 103 is the clear articulation of the reason why the claimed invention would have been obvious. The analysis supporting a rejection under 35 U.S.C. § 103 should be made explicit. MPEP § 2143. Rejections on obviousness cannot be sustained with mere conclusory statements; instead, “there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.” *KSR v. Teleflex*, 550 U.S. 398, 418 (2007) (citing *In re Kahn*, 441 F.3d 977, 988 (C.A.F.C. 2006); *see also* MPEP § 2142. Furthermore, “it can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does.” *KSR*, 550 U.S. at 401.

In addition, the examiner bears the initial burden of factually supporting any *prima facie* conclusion of obviousness. In the present case, the office action asserts that it would have been obvious for one having ordinary skill in the art at the time of the invention to substitute “one or all of the known electrolyte materials” disclosed by the Cochran reference into the fuel cell disclosed by the Shimozu reference to predictably arrived at the applicants’ claims. To reject a claim based on this rationale, the office action must resolve the *Graham* factual inquiries. Then, the office action must articulate the following:

- (1) a finding that the prior art contained a device (method, product, etc.) which differed from the claimed device by the substitution of some components (step, element, etc.) with other components;
- (2) a finding that the substituted components and their functions were known in the art;
- (3) a finding that one of ordinary skill in the art could have substituted one known element for another, and the results of the substitution would have been predictable; and
- (4) whatever additional findings based on the *Graham* factual inquiries may be necessary, in view of the facts of the case under consideration, to explain a conclusion of obviousness.

MPEP § 2143(B).

The rationale to support a conclusion that the claim would have been obvious is that the substitution of one known element for another yields predictable results to one of ordinary skill in the art. If any of these findings cannot be made, then this rationale cannot be used to support a conclusion that the claim would have been obvious to one of ordinary skill in the art. In the present case, the office action fails to fulfill several of these criteria with respect to the various claims. Therefore, the applicants respectfully traverse each of the rejections made to claims 2, 5-10, 13, 14, 18, 20-22, 24, and 25 under 35 U.S.C. § 103(a) and because the rejections cannot be sustained, the applicants submit that the rejections should be withdrawn.

The office action fails to demonstrate mere substitution between prior art devices

The office action must show that the prior art device differs from the claimed device merely by the substitution of one component for another. MPEP § 2143(B). The 35 U.S.C. § 103 obviousness rejections of these claims are thus inappropriate because one does not arrive at the present invention as recited in the claims by modifying the Shimozu reference with the Cochran reference. Independent claims 2 and 5 explicitly require that “the electrolyte layer of at least one of the inner, middle and outer tubular solid oxide fuel cells has a different composition and different optimal operating temperature range than another electrolyte layer in the stack.”

The applicants respectfully submit that the Shimozu reference merely discloses a fuel stack with tubular solid oxide fuel cells and, as admitted in the final office action, “fails to teach the composition of the electrolytes.” The applicants further submit that the Cochran reference merely discloses the use of an electrolyte paste made from any of several base electrolyte powders. Neither reference discloses or even suggests the use of more than one type of electrolyte in a fuel cell stack or the presence of multiple electrolyte layers within a single fuel cell stack.

The simple fact that the Cochran reference discusses the use of various types of materials to form an electrolyte paste does not equate to using multiple types electrolytes in a single fuel cell stack as claimed. Furthermore, the Cochran reference discloses using a single electrolyte paste that has “high oxygen conductivity at lower temperatures (e.g., approximately 400° to 600° C.) so that the fuel cell can be operated at relatively low temperatures.” (See ¶ [0045] of the Cochran reference). Aside from this single reference to a preferred operating temperature of the fuel cell, the Cochran reference is completely silent regarding matching the thermal properties of an electrolyte to its relative position within the fuel cell stack. Simply put, the Cochran reference is unconcerned with matching a particular type of electrolyte to the layer of the stack in which it is used.

Since neither of the cited references discloses each and every limitation of independent claims 2 and 5, the prior art device differs from the claims by more than a mere substitution of one component for another. Therefore, the rejections of claims are

improper and should be withdrawn. Inasmuch as claims 6-10, 13, and 14 depend from and include all the limitations of independent claim 5, the applicants submit that the rejections are improper and should also be withdrawn. Furthermore, claim 18 has been amended to include the limitations of independent claim 5. The applicants, therefore, submit that claims 18, 20-22, 24, and 25 are distinguishable over the prior art for the same reasons as provided for independent claim 5 and respectfully request withdrawal of the rejections of the claims.

The office action fails to provide a showing that one of ordinary skill in the art could have substituted one known element for another, and that the results of the substitution would have been predictable

The office action fails to provide a valid motivation or suggestion based on the cited references that would lead one skilled in the art to arrive at the claimed invention. To support a finding of obviousness, the cited references must expressly or impliedly suggest the claimed invention or the examiner must provide a convincing line of reasoning as to why the claimed invention would have been obvious to one skilled in the art. Reliance upon the knowledge of the person of ordinary skill in the art is not sufficient without that knowledge being instantly and unquestionably demonstrable as being well-known. MPEP § 2144.03(A). Reliance on such “common knowledge” without greater support is specifically prohibited:

A statement that modifications of the prior art to meet the claimed invention would have been “well within the ordinary skill of the art at the time the claimed invention was made” because the references relied upon teach that all aspects of the claimed invention were individually known in the art is not sufficient to establish a *prima facie* case of obviousness without some objective reason to combine the teachings of the references.

*Ex Parte Levengood*, 28 USPQ2d 1300 (Bd. Pat. App. & Inter. 1993). “There must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.” *KSR v. Teleflex*, 550 U.S. 398, 418 (2007). Further, “a patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art.” *Id.* It is important for

the office action “to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does.” *Id.*

The office action contends that one of ordinary skill in the art could have substituted the known electrolyte materials from the Cochran reference for an electrolyte used in the Shimozu reference and “the results of the substitution would have been predictable.” The office action then cites to MPEP § 2144.07 as support for the assertion that “it has been held that the selection of a known material based on its suitability for its intended use is obvious.” The applicants respectfully submit that merely substituting one of the listed electrolyte compositions disclosed in the Cochran reference for another of the electrolyte compositions would not lead one of ordinary skill in the art to the present claims with the requisite predictability.

Independent claims 2, 5, and 18 explicitly require the use of more than one electrolyte within the fuel cell stack, wherein at least one of the electrolytes “has a different composition and optimal operating temperature range.” Merely selecting one of the electrolytes disclosed by the Cochran reference for use in the Shimozu reference does not meet what is claimed and the office action has not identified how one of ordinary skill in the art would view the Cochran and Shimozu references in combination and predictably be motivated to use more than one electrolyte in a fuel cell stack. Since each and every claimed limitation is not found in the prior art it is unclear how the cited references would lead one of ordinary skill in the art to use more than one type of electrolyte in a single fuel cell stack when the concept of doing so is only found in the applicants’ specification and claims.

Because the claimed limitations are not found in the prior art, it is impossible for the office action to provide the necessary “articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.” Instead, the office action appears to base the rejections of the claims on an “obvious to try” rationale. However, this rationale requires a showing that there are a finite number of identified and predictable solutions available to one of ordinary skill in the art. *See* MPEP § 2143. The

applicants respectfully submit that the prior art of record does not indicate that there were a finite number of identified solutions available at the time of the invention. Furthermore, the present claims do not merely substitute one known element for another as suggested by the office action. Instead, the claims explicitly require that “the electrolyte layer of at least one of the inner, middle and outer tubular solid oxide fuel cells has a different composition and different optimal operating temperature range than another electrolyte layer in the stack.”

Therefore, for the reasons stated above, the rejections of claims 2, 5-10, 13, 14, 18, 20-22, 24, and 25 are improper and should be withdrawn.

The office action relies on hindsight to support the rejections

The applicants submit that, in view of the shortcomings of the cited references, the conclusions of the office action can only be reached through the impermissible use of hindsight. The claimed invention is not simply a “predictable use of prior art elements according to their established functions,” and the office action provides no objective reason to combine their respective teachings to arrive at the claimed invention. “A factfinder should be aware ... of the distortion caused by hindsight bias and must be cautious of arguments reliant upon *ex post* reasoning.” *KSR*, 550 U.S. at 421.

*In re McLaughlin* states that hindsight reasoning is proper if it is only taking into account “knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant’s disclosure.” 443 F.2d 1392 (CCPA 1971). In the present case, it is not understood how one of ordinary skill in the art would be motivated to use multiple different types of electrolytes in a single fuel cell stack when the concept of doing so is wholly absent from the prior art. The applicants respectfully submit that the only way to support the present rejections is by using the knowledge found only in the applicants’ specification.

The applicants further submit that the present rejections are exactly the type of distortion that the court in *KSR* warned of. This is clearly inappropriate, as “the teaching or suggestion to make the claimed combination and the reasonable expectation of success

must both be found in the prior art, not in applicant's disclosure." MPEP § 2143. Here, the office action has failed to demonstrate that the prior art discloses the use of more than one type of electrolyte. Because the office action cannot support the rejection without relying on the applicants' disclosure, the rejections are improper and should be withdrawn.


Therefore, the applicants respectfully submit that the Shimozu, Cochran, Hatano, and Du references do not render the claimed invention obvious because they do not disclose all of the limitations of the independent claims and the references provide no motivation to modify the system of the Shimozu reference with the teachings of the additionally cited references to arrive at the claimed invention. The applicants, therefore, respectfully traverse the rejections and request that the rejections of claims 2, 5-10, 13, 14, 18, 20-22, 24, and 25 under 35 U.S.C. § 103 be withdrawn.

CONCLUSION

Please consider the amendments and remarks. The applicants acknowledge and thank the examiner for the notice of allowable subject matter in the office action; however, in view of the present amendments and comments, the applicants respectfully submit that all of the present claims are distinguished from the prior art and are in condition for allowance. Please contact the undersigned attorney at the address and telephone number noted below with any questions or comments.

Respectfully Submitted,

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Date

  
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